conversion region **332**, and thus, red light is selectively transmitted therethrough. In the green pixel G, the green color filter **350**G is disposed on the second photoelectric conversion region **332**, and thus, green light is selectively transmitted therethrough. In the blue pixel B, the blue color filter **350**B is disposed on the second photoelectric conversion region **332**, and thus, blue light is selectively transmitted therethrough.

[0067] The micro-lens layer **370** includes a plurality of micro-lenses **372**. The micro-lenses **372** are respectively disposed on each of the color filters **350**R, **350**G, and **350**B to focus incident light and to send it to corresponding color filters **350**R, **350**G, and **350**B.

[0068] The stacked image sensor **300** may include first barriers **381** that divide the pixels R, G, and B from each other. The first barriers **381** passes through the first photoelectric conversion layer **310** and the second photoelectric conversion layer **330**. The first barriers **381** may have the same structure as the first barriers **181** of FIG. **3**, and the description thereof will be omitted.

[0069] In the first photoelectric conversion layer **310**, a second barrier **382** that separates the two third photoelectric conversion regions **314** may be disposed in the region of green pixel G. The second barrier **382** may have the same structures as the first barrier **381**, and the detailed description thereof will be omitted.

[0070] The first barriers **381** and the second barrier **382** prevent incident light entering corresponding pixels from entering pixels of other adjacent regions that causes a noise.

[0071] The stacked image sensor **300** according to the exemplary embodiment may further include a signal processor that outputs an electrical signal in response to charges received from the photoelectric conversion regions. The signal processor may include three to four transistors per pixel. The signal processor may be disposed under the first photoelectric conversion layer **310**.

[0072] When visible light enters the stacked image sensor **300** from an image measuring object, red light of visible light passes through the red color filter **350**R and generates charges in the second photoelectric conversion region **332**. The signal processor outputs an intensity signal of the red light based on the generated charges. Green light and blue light of the visible light enter the corresponding second photoelectric conversion regions **132** respectively through the green color filter **350**G and the blue color filter **350**B and generate charges, and intensity signals of the green light and the blue light are output by the signal processor based on the generated charges.

[0073] Light that passes through the second photoelectric conversion region **332** of the green pixel G is detected by the two third photoelectric conversion regions **314**. Phase detection auto-focusing may be performed using images of the two third photoelectric conversion regions **314**. An image is photographed by fixing a focus lens at the auto-focusing location.

[0074] After performing the phase detection auto-focusing, a location of a focusing lens may be determined by performing contrast detection auto-focusing with respect to contrast differences of images from the second photoelectric conversion region **332**.

[0075] When an image is photographed under high illumination conditions, an amount of light entering the focusing lens is increased. Accordingly, image photographing may be difficult since the light that entered the second photoelectric conversion region **332** is saturated. In this case, a relatively small amount of light enters into third photoelectric conversion regions **314**, and thus, the fourth photoelectric conversion regions **316** may be used for image photographing.

[0076] The stacked image sensor **300** according to the exemplary embodiment uses only the green pixel region for auto-focusing. Therefore, a structure of wiring connected to the fourth photoelectric conversion regions **316** in the red pixel region and the blue pixel region may be reduced when compared with the stacked image sensor **100**.

[0077] In the stacked image sensor **300** according to the exemplary embodiment, the photoelectric conversion region for auto-focusing is formed in the green pixel region, but the exemplary embodiment is not limited thereto. For example, the two third photoelectric conversion regions may be formed in one region or two regions selected from the four pixel regions of the pixel unit instead of two green pixel regions.

[0078] Also, the fourth photoelectric conversion regions may not be formed in the first photoelectric conversion layer where there is no photoelectric conversion region for auto-focusing. In this case, the wiring structure may further be simplified.

[0079] FIG. **7** is a schematic cross-sectional view of a structure of a unit pixel of a stacked image sensor **400** according to another exemplary embodiment. FIG. **7** may be a cross-sectional view taken along a line II-II' of FIG. **1**. Like reference numerals are used for elements that are substantially identical to the constituent elements described above, and the descriptions thereof will not be repeated.

[0080] Referring to FIG. **7**, the stacked image sensor **400** may include a plurality of pixel units arranged in an array. Each pixel unit may include two green pixels G, a red pixel R, and a blue pixel B.

[0081] Each pixel unit may include a first photoelectric conversion layer **410**, and a second photoelectric conversion layer **430**, a color filter layer **150**, and a micro-lens layer **170** that are sequentially stacked on the first photoelectric conversion layer **410**.

[0082] The first photoelectric conversion layer **410** and the second photoelectric conversion layer **430** may be regions disposed on a silicon layer **440**. The first photoelectric conversion layer **410** may include first photoelectric conversion regions **412** disposed in each pixel. The first photoelectric conversion region **412** may include a plurality of third photoelectric conversion regions **414**. In FIG. **7**, two third photoelectric conversion regions **414** are depicted in a pixel region.

[0083] The second photoelectric conversion layer **430** may include a plurality of second photoelectric conversion regions **432**. Each second photoelectric conversion region **432** may include a plurality of fourth photoelectric conversion regions **434**. In FIG. **7**, two fourth photoelectric conversion regions **434** are depicted in a pixel region. The two third photoelectric conversion regions **414** and the two fourth photoelectric conversion regions **434** in the pixel may be doped regions. For example, the silicon layer **440** may be a region doped with a first type impurity, and the third photoelectric conversion regions **414** and the fourth photoelectric conversion regions **434** may be regions doped with a second impurity.

[0084] The fourth photoelectric conversion regions **434** may be general image detection regions. The fourth photo-